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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/008,383	12/06/2001	Gregory G. Freeman	FIS920010321US1	2901

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INTERNATIONAL BUSINESS MACHINES CORPORATION
DEPT. 18G
BLDG. 300-482
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HOPEWELL JUNCTION, NY 12533

EXAMINER

DICKEY, THOMAS L

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 12/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/008,383		FREEMAN ET AL.	
	Examiner		Art Unit	
	Thomas L Dickey		2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-23 is/are pending in the application.
- 4a) Of the above claim(s) 12-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-8 and 10 is/are rejected.
- 7) ☒ Claim(s) 9, 11 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

1. The amendment filed on 29 October 2003 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4,6-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over COMFORT et al. (5,106,767) in view of CHEN et al. (5,017,990).

Comfort et al. discloses a bipolar transistor, comprising a substrate 6, a semiconductor intrinsic base layer 3 formed on the substrate 6, a collector layer 5 formed on the substrate 6, an emitter 2 formed over the semiconductor intrinsic base layer 3, forming a junction between the semiconductor intrinsic base layer 3 and the emitter 2, an extrinsic base 4 formed adjacent to the lateral portion of the emitter 2, a raised extrinsic base layer 26 comprising one of a highly-doped polysilicon or a highly-doped amorphous silicon, namely, a highly-doped polysilicon, a base electrode (not shown in the figures, see column 11 lines 25-29 and 62-65) formed on a portion of the extrinsic base layer 26, a collector electrode (not shown in the figures, see column

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11 lines 25-29 and 62-65) formed on a portion of the collector layer 5, an emitter electrode 9 formed on a portion of the emitter 2, and a sidewall spacer 18-19-20 (part 8 in figure 10), comprising either or both of a silicon nitride or a silicon dioxide, formed between and electrically isolating the emitter 2 and the extrinsic base layer 26. Note figures 1-10 and column 4 lines 41-65, column 5 lines 5-28, column 6 lines 34-55, column 7 lines 8-30, column 8 lines 55-61, and column 11 lines 25-29 and 62-65 of Comfort et al.

Comfort et al. does not disclose that the emitter comprises a pedestal having a top which contacts an emitter layer, or that the junction at a lateral portion of the emitter extends farther into the intrinsic base layer than the junction at a center portion of the emitter. However, Chen et al. discloses a bipolar transistor having a semiconductor intrinsic base layer 2 and an emitter 11 comprising a pedestal (the limits of the pedestal are seen as lines 10D) having a top which contacts an emitter layer 10A, where the junction between the semiconductor intrinsic base layer 2 and the emitter 11 at a lateral portion of the emitter 11 extends farther into the intrinsic base layer 2 than the junction at a center portion of the emitter 11. Note figure 1 of Chen et al. Therefore, it would have been obvious to a person having skill in the art to replace the emitter of Comfort et al.'s bipolar transistor with the emitter comprising a pedestal having a top which contacts an emitter layer, where the junction at a lateral portion of the emitter extends farther into the intrinsic base layer than the junction at a center portion of the emitter, such as taught by Chen et al. in order to allow a mesa-type intrinsic base to be formed

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between recessed oxide portions out of a conformal p-type layer of which portions (said portions ultimately forming the lateral portions of the emitter) are then converted to n-type, thus provide an efficient means of epitaxially laying down the base, while at the same time, building a "built-in" emitter (thus saving steps of implantation and/or diffusion) that effectively prevents current from leaking past the emitter.

Furthermore, with respect to claims 4, 8, and 10, Comfort et al. and Chen et al. disclose the claimed invention except for the lateral portion having a depth in a range of approximately 20-40 nm, the sidewall spacer having a width in the range of 10 to 70 nanometers, and the emitter layer having a thickness in the range of 30 to 200 nanometers. It would have been obvious to one of ordinary skill in the art at the time the invention was made to produce the claimed invention in the depth, width, and thickness ranges claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. See also In re Peterson, 65 USPQ2d 1379.

Allowable Subject Matter

3. Claims 23, 9, and 11 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims.

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Response to Arguments

4. Applicant's arguments with respect to claims 1-4,6-8 and 10 have been considered but are moot in view of the new ground(s) of rejection. It should be noted that claim 1, as amended, is broader than claim 5, as initially presented and indicated allowable. Claim 5 initially included the limitation, brought down from claim 1, of a blanket epitaxially formed base layer. This limitation is not found in amended claim 1 (nor in either of the references now cited), although it is present in new claim 23.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 703-308-0980. The examiner can normally be reached on Monday through Thursday 8 AM to 6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-3431.

tld
12/2003


Minhloan Tran
Primary Examiner
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